30 Jun 2000

From: Commanding Officer, NRL S&T 510, Houston, TX
To: Commanding Officer, Naval Research Laboratory

Subj: NRL S&T 510 FY 2000 THIRD QUARTER UNIT REPORT

1. This letter forwards my FY 2000 Third Quarter Report, which contains information summarizing the Peacetime Contributory Support (PCS) activities of NRL S&T 510 during the period from 1 April 2000 through 30 June 2000.

2. The report is formatted in MS word with links providing direct access to specific accomplishments from the summary tables. Click on a project name for supporting information. The blue back arrow in your web toolbar provides a return path to the table.

3. Unit member biographies, including contact information, may be found on the web at http://www.onr.navy.mil/reserves/units/st510.

4. AT/IDTT Highlights:

a. LT Andrew Hamilton completed a two-week AT from 07 - 19 May at the Naval Research Laboratory, Washington, DC, where he provided technical support to the Spacecraft Engineering Department of the Naval Center for Space Technology (Code 8230). See project description for his accomplishments.

b. LCDR Sylvia Murphy completed a two-week AT from 24 April – 5 May at the Naval Research Laboratory, Stennis Space Center, MS, where she continued her work on the simulation of Argo drifting buoys. See project description for her accomplishments.

c. CDR(sel) Greg Dulaney completed a two-week AT from 24 April – 5 May at the Naval Research Laboratory, Center for Corrosion Science & Engineering, Key West, FL, where he completed his work testing ZERON 100 for crevice corrosion. See project description for his accomplishments.

d. LCDR Craig Cobb completed a 17-day AT from 01 May – 17 May aboard the R/V Pelican. All primary and secondary missions were accomplished.

e. CDR AJ Murphy completed a 2-week AT from 19 – 30 June at the Naval Research Laboratory, Center for Corrosion Science & Engineering, Key West, FL, where he completed part two of a three-part joint deep-sea corrosion research program. See project description for his accomplishments.

f. LCDR John Brown completed a 9-day no-cost IDTT from 05 – 15 June at the South Florida Ocean Measurements Center, Dania Beach, FL, where he provided ocean surface current data and other meteorological/oceanographic support for the Fleet Battle Experiment – Hotel Rehearsal of Autonomous Underwater Vehicles. See project description for his accomplishments.

g. CDR George Spencer completed a 12-day AT from 08 – 19 May at the Naval Research Laboratory, Washington, DC, where he performed preliminary tests on gell formation in military aviation turbine fuel. See project description for his accomplishments.

/s/ G. C. Johnson

Electronic copy to:
Commanding Officer, N&MCRC, Naval District Washington
Director, S&T Reserve Program (ONR Code 45)
Reserve Program 38 Commanding Officers

I. NRL S&T 510 PEACETIME CONTRIBUTORY SUPPORT

Project Title: Electro-Optical Bathymetry Retrieval Evaluation

Reserve Project Team: LCDR Craig Cobb, NRL S&T 510

Project Customer: Dr. Pete Smith, Oceanography Division, NRL Code 7340

Accomplishments:
1) Project is completed.

Project Title: Remote Sensor Agreement in Ocean-Color Analysis

Reserve Project Team: LT John A. Thomasson, NRL S&T 510

Project Customer: Remote Sensing Branch, Ocean Color Group, NRL Code 7343

Accomplishments:
1) No activity this quarter.

Project Title: Chesapeake Bay Outflow Plume Experiment I (COPE I)

Reserve Project Team: LCDR John E. M. Brown, NRL S&T 510

Project Customer: Dr. Bob Arnone, Multi-spectral Sensing and Applications division, NRL Code 7343

Accomplishments:
1) Attended Sixth International Conference of Remote Sensing for Marine and Coastal Environments. Observed numerous presentations on remote sensing techniques useful for understanding the links between ocean dynamics and ocean color, including those of the project sponsor, Dr. Arnone.
2) Ran MATLAB program at RSMAS on the COPE I data set. Transferred data from NRL Stennis to RSMAS for further analysis.

Project Title: **Array for Real-time Geostrophic Oceanography (ARGO)**

Reserve Project Team: LCDR Silvia J. Murphy, NRL S&T 510

Project Customer: Dr. Harley Hurlburt, NRL Stennis

Additional Information: http://news.bbc.co.uk/hi/english/sci/tech/newsid_692000/692647.stm

Accomplishments:

Ocean Simulations:

- Completed two additional five-year ocean model simulations of Argo drifting floats. They differed by their time-on-surface (12 and 18 hours respectively).

Analysis:

- Analyzed initial float seeding in the model to determine the optimal way to divide the model grid into bins of equal floats. This value was used as a control.
- Took data from the last day of each year and counted the floats in each bin. Calculated the global average and the standard deviation.
- Fixed error in landmask due to topography being on different grid than buoys.
- Recreated all netCDF files with new landmask.
- Reran bin analysis.
- Verified that the landmask generated weights were correct.

Results:

- Created an x-y plot of standard deviations by year and global plots of grid bin density.
- Results of this work presented by Dr. Harley Hurlburt at the Global Ocean Data Assimilation Experiment (GODAE) workshop in England on 16 May.
- Created new plots of global bins as contours rather than as raster plots.

Project Title: **Laser Testing of Night Vision Devices**

Reserve Project Team: LT Jerri Tribble, NRL S&T 510

Project Customer: Steve Walker, NRL Washington Code 6336

Accomplishments:

1) Completed testing and test report.

Project Title: **Geospatial Information DataBase (GIDB)**

Reserve Project Team: LCDR Craig M. Cobb, NRL S&T 510

Project Customer: Kevin Shaw, NRL Stennis, Code 7440.2 (Mapping Charting and Geodesy)

Accomplishments:

1) No activity this period.

Project Title: **Technical Opportunities Analysis System (TAOS)**

Reserve Project Team: LCDR Patricia Jaklitch, NRL S&T 510

Project Customer: CAPT Ryan, London IFO

Accomplishments:

1) Downloaded and installed the TechOASIS software and macros.
2) Downloaded and installed the Active X controls necessary to gain access to the ONR-HQ servers.
3) Searched the ONR-HQ servers as well as the IFO servers (in London) for past datasets created to be used in the new assignment.
4) Investigated several database websites, including Dialog, STINET and DTIC.
5) Reviewed the assignment and keywords suggested by CDR Butler for the data search.
6) Imported dataset from last October into the TechOASIS software and reviewed numerous abstracts for additional keywords which may be useful for this assignment.
7) Conducted several test searches at the Dialog website to gain familiarity with the command syntax.
8) Downloaded the free Dialog tutorial for later use.
9) Created a short spreadsheet to forward to CDR Butler which had his keyword list and developed an additional keyword list.

Project Title: **Northern Gulf of Mexico Littoral Initiative (NGLI)**

Reserve Project Team: LCDR Craig M. Cobb, NRL S&T 510

Project Customer: Naval Oceanographic Office (Scientific Technology Staff, Code OTT)

Chief Scientist: Carl Szczechowski

IDTT Accomplishments:

1) Accompanied chief scientist to NRL Stennis to meet with Geoacoustics-geotechnical section (code 7431). Discussed sensor deployment plans and collaborative efforts during upcoming survey. Coordinated plans for training/deployment of instruments prior to sail.
2) Attended training on operation of NRL's Acoustic Sediment Classification System (ASCS).
3) Digitized nautical charts to assist in developing initial bathymetry grid for researcher's use.
4) Requested information on MovieGear.
5) Requested copy of code from Texas A&M TABS webmaster for web access counter.
6) Copied Rutgers temperature conversion chart – permission required for use.
7) Downloaded PC version of GRADS for evaluation.
8) Coordinated receipt of requested code. Forwarded to chief scientist for implementation.
9) Completed converting time zone software.

AT Accomplishments:

1) Completed primary mission: gravity survey.
2) Completed secondary missions: physical parameter measurements:
   a. Using the ASCS (water depth, soil depth and type).
   b. Using expendable bathythermograph (water depth, temperature, salinity, conductivity and particulate content).
   c. Using the Acoustic Doppler Current Profiler (currents).
   d. Using the AC9 (optical parameters – transmissivity, conductivity, clarity, temperature, absorption/attenuation).
   e. Using the CTD Profiler (conductivity/temperature depth)
3) Assisted setting up the NRL Stennis ASCS system aboard R/V Pelican.
4) Provided programming support in GMT (Generic Mapping Tools).
5) Identified and tagged data over areas of significant oceanographic features.

Project Title: **Regional Naval Science Awards Program Support**

Reserve Project Team: CAPT Robert C. Trevino, NRL S&T 510

Project Customer: Bruce Thompson, Public Affairs Division, ONR Code 353

Accomplishments:

1) No activity this quarter.

Project Title: **Acoustic Seafloor Classification Profiler (ASCP)**

Reserve Project Team: CDR RJ Rusnak, NRL S&T 510

Project Customer: Dale Bibee, NRL Stennis, Code 7430

Accomplishments:

1) Completed the Verilog design of the complex programmable logic device (CPLD) for the timer printed circuit board (PCB). This one CPLD chip performs the functions of over thirty chips from the original timer PCB design, however this new design allows logic changes to be made quickly and easily without cuts or wires on the PCB.
2) Completed the Verilog design of the eraseable programmable logic device (EPLD) for the new timer board. The EPLD allows the host processor to configure or reconfigure the CPLD via the AT bus. This makes the function of the board much easier to modify in the field. The timer board's function could be completely changed without opening the system.
3) Completed the schematic for the new timer PCB.
4) Sent the new timer board netlist to the contract engineering firm responsible for fabricating the new board.
5) Reviewed the physical design check plots. Provided feedback for improvements.
6) Determined AT dates to allow participation in the bring-up of the board in July and testing of the overall system in early August.

II. NAVAL RESERVE ACTIVE DUTY SUPPORT TO NRL WASHINGTON, D.C.

Project Title: NASA/NRL Interim Control Module (ICM) Program

Reserve Project Team: CAPT Gregory C. Johnson, NRL S&T 510

Project Customer: Mr. Al Jacoby, NRL Space Transportation Directorate

Accomplishments:
1) No activity this quarter.

Project Title: Thruster Engine Characteristics for the Dynamic Motion Simulation

Reserve Project Team: LT Andy Hamilton, NRL S&T 510

Project Customer: Sam Hollander, NRL Washington D.C. (Code 8230). Robotics Engineering and Controls Laboratory of the Spacecraft Engineering Department for the Naval Center for Space Technology

Accomplishments:
1) Developed performance equations and mass properties changes as a function of reaction control thruster design and placement.
2) Assigned to work in the dual-platform satellite rendezvous simulator.
3) Researched the various models of reaction control thrusters used in commercial and military satellites to provide a database of parameters and properties of the thrusters. The database will be used as a library so that different models of thrusters can be analyzed for different satellite configurations.
4) Developed the basic equations of motion to determine thrust and torque developed by a particular jet configuration dependent on location of the jet and type of jet selected.
5) Developed the pressure/mass relation of the propellant and pressure source as the propellant is consumed during thruster pulses.
6) Determined the effect of thruster pulses from the chase satellite on the target satellite as a function of thruster location, pulse size and distance to the target. This information is important to understand since the maneuvering pulses of the chase satellite may impinge on the target satellite and cause attitude dispersions or rotations.

Project Title: ZERON 100 Crevice Corrosion

Reserve Project Team: LCDR Greg Dulaney, NRL S&T 510

Project Customer: Keith Lucas, NRL Washington

Accomplishments:

1) Completed a one-year long environmental study of the effects of sea water on ZERON 100 (a super duplex stainless steel alloy) to determine its susceptibility to crevice corrosion.
2) Disassembled twenty-four different ZERON 100 specimens, cleaned and documented the results. This included detailed observation of the samples, photographic analysis and categorization of the results for further study.
3) Completed a summary report of the initial finding.

Project Title: Materials Laboratory Support

Reserve Project Team: LCDR Jerri Tribble, NRL S&T 510

Project Customer: Steve Walker, NRL Washington, code 6336

Accomplishments:

1) Completed optics/hardware procurement/alignment for new laser beam line in laboratory.
2) Provided software programming support for existing and new equipment interfaces.

Project Title: Deep Sea Corrosion Research

Reserve Project Team: CDR AJ Murphy, NRL S&T 510

Project Customer: NRL Code 6136

Accomplishments:

1) Inspected samples of coatings, etched coatings and metal tube samples (titanium, incanel, B59, B276, etc.)
2) Photographed "as is" and after cleaning.
3) Weighed samples.
4) Microscopic evaluation of corrosion effects.
5) Recorded and documented all findings.
6) Acted as lab liaison with NAS Key West on several facilities projects for the site:
   a. changing high voltage wiring to pump building
   b. installing electrical mast to building and remove existing electrical pole so experiment area could be set up on new concrete slab
   c. wrote and submitted complete package to NAS Key West CO (via Public Works) to request additional facilities space for exposure testing area for coatings facility
7) Updated reserve sign-up and check-in package for laboratory and trained newly assigned reserve coordinators for the corrosion lab and coatings facility.

Project Title: **Gell Formation in Military Aviation Turbine Fuel**

Reserve Project Team: CDR George Spencer, NRL S&T 510

Project Customer: Dr. Dennis Hardy, NRL Washington, code 6121

Accomplishments:

1) Performed tests that verified that several possible conditions that were thought to produce fuel gell did NOT in fact produce gell. This preliminary work was necessary to eliminate non-productive testing protocols before developing a field scale test.

III. NON-NSAP/NRL PROJECT SUPPORT

Project Title: **Laser Eye Exposure Susceptibility Analysis**

Reserve Project Team: LCDR Jerri A. Tribble, NRL S&T 510

Project Customer: Dr. Norm Barsalou and Dr. Sean Biggerstaff, Naval Health Research Center Detachment Brooks AFB

Accomplishments:

1) No activity this quarter.